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ABSTRACT

Along with the growth of electronic communication in higher education, is the rise of virtual classrooms. Virtual classrooms exist because of technologies such as electronic mail, listservs, chat rooms, and World Wide Web pages. This qualitative research study examined one graduate course which was offered entirely over the Internet. Data from listservs and e-mail messages, student journals and time logs, transcripts of chat sessions, and a group interview was collected and analyzed. The analysis revealed four major themes related to student perceptions and performance: student peer support, student-to-student interaction, faculty-to-student interaction, and time demands of the course. A definitive community of learners emerged despite the distance of the learners and the lack of face-to-face contact. Students were able to develop rapport and provide support to one another and were able to develop and maintain interactions that may not have been attainable in a regular classroom situation. The faculty-student relationship also manifested itself differently. Although the instructor remained the "head of the class" during synchronous chat sessions, during the asynchronous communication the instructor became less of a purveyor of information and everyone in the class became part of the community of learners. Although students felt that the course was more time demanding because of the format, analysis of the time logs revealed that additional time was spent "surfing" the Internet and the perception was more a function of perceived time in front of the computer. From the analysis of student performance and perceptions in this particular class, it is apparent that even as virtual classrooms become more prolific, the classroom community of learners can continue to flourish. A sample course schedule and example of data organization are provided. (Contains 10 references.) (Author/AEF)

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# Student Perceptions and Performance in a Virtual Classroom Environment

Susan M. Powers
Indiana State University

Jennie Mitchell
Indiana State University

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Correspondence may be directed to the first author at the Department of Curriculum, Instruction and Media Technology, School of Education, Indiana State University, Terre Haute, Indiana, 47809. Email: espowers@befac.indstate.edu; voice: 812-237-2946.

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## ABSTRACT

Electronic communication has become an integral element in the higher education environment. Along with the growth of electronic communication is the rise of virtual classrooms. Virtual classrooms exist because of technologies such as electronic mail, listservs, chat rooms, and web pages. However, how do students perform in and perceive these new classroom environments? This qualitative research study examined one graduate course which was offered entirely over the Internet. Data from listserv and email messages, student journals and time logs, transcripts of chat sessions, and a group interview was collected and analyzed. The analysis revealed four major themes related to student perceptions and performance: student peer support, student-to-student interaction, faculty-to-student interaction, and time demands of the course. A definitive community of learners emerged despite the distance of the learners and the lack of face-to-face contact. Students were able to develop rapport and provide support to one another. Additionally, they were able to develop and maintain interactions that may not have been attainable in a regular classroom situation. The faculty-student relationship also manifested itself differently. Although the instructor remained "head of the class" during synchronous chat sessions; during the asynchronous communication, the instructor became less of a purveyor of information and everyone in the class became part of the community of learners. Although students felt that the course was more time demanding because of the format, analysis of the time logs revealed that additional time was spent "surfing" the Internet and the perception was more a function of perceived time in front of the computer. From the analysis of student performance and perceptions in this particular class, it is apparent that even as virtual classrooms become more prolific, the classroom community of learners can continue to flourish.

Student Perceptions and Performance in a Virtual Classroom Environment

The evolution of computer-based instruction over the past 20 years, and the development of academic courses offered over the Internet has created a new form of educational community with its own culture and "strong" discourse (Blair, 1995; Kuehn, 1995). Computer mediated instruction is a media technology that functions differently than traditional print or broadcast instruction (Kuehn, 1994). Through Internet classrooms, students and faculty can communicate asynchronously and synchronously. These methods provide usage, response and impact considerations different from the traditional classroom setting (Kuehn, 1994). Learning on the Internet can take the form of 1) electronic mail (e-mail) and electronic discussion groups (listservs or chat rooms); 2) bulletin boards/newsgroups; 3) downloadable course materials or tutorials; 4) interactive tutorials on the Web; 5) real-time, interactive conferencing; and 6) infomatics, the use of on-line databases (Kerka, 1996).

The Internet classroom can provide learners access to the "best" information, overcoming geographic, distance, resources, disability or time barriers (Kerka, 1996; Sugar & Bonk, 1995). Internet tools for writing and conversation (i.e., E-mail, listserv and chat room responses) enrich students' discussion, dialogue, and debate (Sugar & Bonk, 1995). This community of learners, bound by a shared interest in a topic or a shared background, guides and challenges learners to new areas of growth by fostering collaborative production and analysis of information, and by triggering cognitive dissonance or disequilibrium when confronted by alternative views or opinions, that motivates learners to seek additional information (Sugar & Bonk, 1995). Furthermore, this electronic community of shared interest, not geographic space, must balance the virtual classroom and, "direct interaction in sustaining communion among people" (Kerka, 1996).

E-mail and listservs are asynchronous communication. The message can be read, studied, and a response sent at staggered times and at the participant's convenience (Kuehn, 1994). E-mail provides students direct contact with each other and the instructor without time restraints of office hours and class time, or space restraints of distance (Kerka, 1996; Partee, 1996). Students from the university class which is the subject of this paper attended classes via the Internet from locations in various parts of Indiana. One student attended several of the chat sessions while vacationing in Canada.

Direct and immediate interaction is not a factor in determining intellectual interaction (Partee, 1996). But it can, "serve as a microcosm of cultural assumptions and attitudes..."(Blair, 1995, p.5). Participation by students that may seem uninterested or uninvolved in normal classroom settings reveal synchronous communication of quality and quantity, reflecting a depth of commitment that amazes instructors: "...students were liberated from social restraints of the classroom" (Partee, 1996, p. 79). They felt judged on content and not on physical external features; speech or hearing disabilities, race, language, etc. (Kuehn, 1994; Partee, 1996).

It is clear that the Internet classroom creates new possibilities of teaching and learning. Network and on-line technologies are changing faster than research studies can be designed (Sugar & Bonk, 1995). To what extent do students and instructors adapt to the medium over time to develop working relationships? In Internet classrooms, what is the level of debate or effect on group interaction? (Hettinger, 1995). This research study focuses on these questions; in particular, the focus is on student performance in and perceptions of a virtual classroom.

## METHOD

This research study was qualitative in its methodology and various techniques were used to garner as much information as possible. First, in order to gain an accurate sense of student perceptions and related performance, naturalistic research methods were employed (Neuman, 1989; Erickson, 1986). The class was conducted in exactly the same manner as if no data was being collected and analyzed. This methodology allowed for more natural interactions between the students and between the students and instructor. Additionally, since the ultimate outcome of the course was not the research but rather the increased learning and knowledge of the students, naturalistic methods allowed for the course to be tailored and altered as needs of the students became apparent.

Second, another qualitative technique call inductive analysis (Patton, 1990) was used at the completion of the course and after grades were submitted. Students in the course were brought together on site for a debriefing session regarding their perceptions of the course. All questions were open-ended, and the students themselves ran the debriefing session with occasional questions from the researchers. The debriefing session was only conducted upon submission of grades in order to not disrupt the naturalistic inquiry and natural flow of the course or to prohibit students from providing their true perceptions.

The research reported here was conducted by two researchers. One researcher was the instructor of the class while the other was a participant in the class. The participant researcher played a fully active role in data analysis and in the creation of this paper. However, as a participant in the class, she did not take part in the research until the conclusion of the course.

### Materials

The core basis for this research study was a graduate course entitled, "Accessing Information Through Technology." This course was offered entirely over the Internet with no face-to-face contact between the instructor and students. The course took place during a

five week summer session. Had the course met face-to-face, it would have met five days a week, two hours each day. Course materials consisted of a class web page, a required and an optional textbook, a class listserv, and a class Internet relay chat (IRC). The electronic course materials are described in greater detail below.

The class web page (Powers, 1996) began with what essentially served as the course syllabus. This page contained information about all aspects of the course including instructor information, course goals and expectations, course assignments and due dates, points and grading criteria, as well as a course schedule. The course schedule provided hypertext links to web pages "of the day." For example, the course schedule shows that Media Literacy is the topic for the second day (see Figure 1). The hypertext links students to a page that contained all pertinent information for July 17.

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Insert Figure 1 about here

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Every day on the course schedule had an associated web page for that day. The schedule kept students on track for assignment due dates, but also gave students the ability to work ahead. This format provided the structure and metaphor of a face-to-face classroom. On each day's web page, announcements (i.e. upcoming due dates, reminders about assignments, last minute changes in the schedule, etc.) were provided, followed by a lecture. The lecture section covered the topic of the day, such as media literacy or criteria for evaluating web sites. The next section gave students readings, both from textbooks and from the Internet, that were to be completed prior to the next class. Finally, when appropriate, discussion questions were given that students must discuss over the class listserv.

The second course material consisted of the class listserv. In order to have a shared, community discussion, all discussion took place over a class listserv. When discussion questions needed to be posted or the instructor had class announcements, all of

these were posted to the discussion group. Students could still use email for private conversation with the instructor.

The final electronic course material was the class Internet Relay Chat (IRC). In order to provide some synchronous class discussion, as might take place in face-to-face instruction, the instructor and students logged into a chat room at the same time for a class session. These chats took place for one hour on thirteen different occasions. The purpose was to expose students to another form of informational technology (as with the web page and the class listserv) but also to provide a real-time forum where students could ask questions and receive immediate responses. In contrast, a listserv and email message might not be responded to until the following day.

Subjects

The subjects for this research were students enrolled in the graduate course described above. Students consisted of both on-campus and remote users. The course/study began with ten participants. One remote student had to drop the course due to work demands, and another remote student had her computer break down during the first work requiring her to take an Incomplete course grade. One on-campus student dropped the course for personal reasons. The remaining seven students completed the entire course. Four of these students consistently completed coursework remotely while the other three did a combination of remote and on-campus work.

Of the seven students who completed the entire course, five were degree-seeking candidates (three at the doctoral level, two at the master's level). The remaining two students were public school teachers who were taking the course for professional development. The technology ability of the students ranged from one student who had no prior experience with any of the information technologies to one student who had used all the technologies employed as course materials. Two of the seven students were Asian (1

male and 1 female) and the remainder were White (4 male and 1 female). Only three of the students had been in a class together prior to this course.

Data Collection

A course run over the Internet using electronic communication provides a host of data sources. First, all email and class listserv correspondence were saved and archived. This listserv alone generated over 800 messages during the five week period. Approximately one half of these messages were related to required course assignments, the remainder were based on student-initiated discussion.

Next, as a class assignment and for course evaluation purposes, all students were asked to maintain a journal and time log of their activities. The time log would provide an accounting of how much time students were spending on the course, while the journal gave insight into students thoughts and reactions during the class. (Journals and time logs are a regular instructional tool used by this faculty member to provide formative evaluation of a course). The journals and time logs were submitted electronically on a weekly basis. Points were awarded on a competency basis, i.e. full points for turning it in and no points if it wasn't submitted. At no time was a qualitative judgment for a grade given on the journals or time logs.

Finally, the chat software used by the instructor had the capability of saving a transcript of the chat session. Therefore, the entire one-hour class discussion could be saved electronically for future analysis. All these data collection methods support the naturalistic inquiry methodology.

As discussed earlier, a group debriefing interview was held upon completion of the course. This session was videotaped for later analysis. Both researchers participated in the debriefing session. One student was unable to attend the group interview due to a teaching commitment, but he provided some feedback over email regarding his general perceptions.

Classroom Procedures

Conducting a class over the Internet provides a unique opportunity for data collection. Every aspect of it lends itself to information archival; therefore, actual classroom procedures did not need to change for data collection. For example, transcripts were maintained of class on-line chats so in case of student absence or dispute there were reference materials. Students maintained time logs and journals for the purpose of reflection and to provide the instructor with ongoing formative evaluation information. The final debriefing session was also held for course evaluation purposes. During the final debriefing session, permission was sought from and given by the students to use the messages in a research study.

Data Analysis

Data analysis began by reviewing all the information collected. The pool of data included the videotaped debriefing session, all email and listserv discussion, chat transcripts, and student journal and time logs were reviewed at least two times to develop familiarity with the content. Each researcher attacked the information separately and began to look for themes related to student perceptions and performance. As the themes emerged, the researchers placed the information in tables which identified the source of the data (i.e., journal, listserv, etc.), the data of occurrence, the student name, and the type of information (i.e., observation, quote, etc.). (See Table 1 for example).

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Insert Table 1 about here

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The two researchers then compiled their analysis and searched for similarities and differences. This part of the analysis allowed the researchers to condense overlapping

categories and clarify themes. The final analysis revealed four themes/categories: peer support, inter-student interaction, student-faculty interaction, and time demands.

## RESULTS

Interestingly enough, none of the four categories that emerged during data analysis (peer support, inter-student interaction, student-faculty interaction, and time demands) are necessarily unique to an Internet course. However, what is interesting for the purposes of this research are the students perceptions and performances in an Internet-based course.

### Peer Support

Despite research indications that students functioning over a distance network can create a community of supportive learners (Kerka, 1996), it was anticipated that the combination of the short time span and the distance learning environment, it would be difficult for the students to develop a supportive community. However, what emerged was a true community of learners who were committed to providing encouragement and support to each other throughout the course. One possible reason for the perceived safety and support of the community emerges from the use of the technology. A student indicated that he felt more comfortable to share information with peers because of the perceived anonymity of electronic communication:

> I felt more protected here to say something, both to respond [to comments] and to make initial comments.

This safety is what is hoped for in any classroom situation, but the technologies helped to make this student feel as though he would not be personally judged (either by facial expressions or comments) by his peers.

At times, students would pose somewhat rhetorical questions on the listserv or even more likely, during the chat. These questions were statements such as, "I'm not sure how I am going to get started on my website," or, "I'm trying to figure out the best way to start

this paper." These statements were the students thinking out loud, often generated by a message sent by the instructor about an upcoming due date. The following conversation is an example that took place during a chat:

> Instructor: How are you doing with your web site development?
>
> Student 1: I have the basic outline of my web page done, but not all the information collected.
>
> Student 2: I'm not even sure where to start!!!
>
> Student 3: Me too. I have my info, but can't quite get started.

This interaction could be seen as just casual conversation. However, the supportive nature of this group became apparent as students reported that they began to receive email tips and suggestions from their peers. However, when someone vents frustration or states a rhetorical, s/he may not be really seeking an answer and may not be receptive to suggestions. It is difficult to ascertain if this type of support is appreciated. One student exemplified this appreciation in a journal entry:

> The book I bought yesterday has too much reading for me and it really drove me crazy. I do not know how to handle it. Some classmates suggested to me that I just jump into the editing part and do it. I think it was a very good idea for me because I always try to read and then do it. I hope it works.

Finally, one student summarized for everyone during the debriefing session what he thought of the support of his peers:

> I felt a closer rapport with the students here [in this class]. With this technology, I felt I was addressing the individual and not the class as a whole... I had time to think out my responses and provide constructive criticism. I would never do that in a class with a teacher standing there.

Again, this student felt that the unique nature of the technology, in this instance the asynchronous nature of email, allowed him to be a more thoughtful classmate. This same

student also felt strongly enough about the supportive environment of the class to apologize to one student for a potential misunderstanding:

> Dennis made a point in his response to an example I tried to make using Jean's service.
> "Regarding Jean's service, I do not believe that it is appropriate to attempt to make an inferentially plausible leap." -- Dennis
> He is of course right, and I apologize Jean if you or anyone thought I was making reference that YOU would snoop in e-mail. I only was referring to your service as an example of being a small server.

Student to Student Interaction

Beyond the supportive nature of the student interaction, there are the general interactions that occur among students in a classroom situation. The support students felt from their peers has already been examined, but what about the discussions that were held by students? There were no assignments or requirements for students to hold discussions over the class listserv. The class chat was employed for the express purpose of ensuring that discussion would occur at some designated point in the class and the chat appeared to have that affect for some students, as indicated by a journal entry:

> ...in our course, the part of the class I like the most ... is the on-line chat. I like attending classes always! Actually, I like the contact with people more than working by myself.

One student indicated that he could not get enough of the interaction and stimulation that came from the chat:

> I couldn't get enough of the conversation. I talked to David and Dennis all the way out to the parking lot... still carrying on the conversation.

However, of the over 800 messages posted to the class listserv and sent over email, slightly under half were directly related to required assignments. The remainder of the messages were class discussion based mostly on responses to discussion questions that students posted. One such discussion question asked students about their perceptions on how the world wide web might affect their lives. To complete the assignment, one student posted the initial message and a challenge to his classmates for elaboration, and the responses that came after were classmates' reactions to his message:

> Daniel: In the year of 2020, the www will replace TV, stereo and VCR in my home. The first thing for me in the morning is to turn my computer on and watch the NBC morning news on the web and the Terre Haute Tribute Hyperstar will send me local news on my e-mail account. I talk to my secretary about today's schedule and meet my boss on the web. My doctor call me in England by web phone and remind me our appointment at 10 on http://www.takemedicine.hosp. I order my lunch on web restaurant and they charge me at my saving account in Terre Haute First Internet Bank. I go to Honey Creek webmall afternoon and try my new suit on www. I watch the America's funniest Internet Joke at night. I have no idea after that. anyone want to continue this story?
>
> Dennis: I really like your specific examples of what you believe your life will be like.
>
> Ken: how would you try on clothes at a webmall??
>
> Jean: What about family? Will you meet the future Mrs. Daniel over the Internet? You could add that part to the scenario.

When the focus of the class shifted from discussion to development of the web sites, students indicated that they were disappointed that much of the dialogues had disappeared. This notion is illustrated in the following journal submission:

> Note that it is rare to have any discussion questions anymore on the Internet. I kind of miss them - they seem to stimulate much feedback. Granted, they are time consuming, however, this is a graduate class and we should be held to the task.

However, not all of the class discussion was initiated by discussion question. Right from the first week, students felt comfortable initiating discussion based on their own personal experience or from items they had garnered from the news. The following is just one example of many where students shared information and then received feedback and additional information back from their classmates:

> Ken: FYI, today's Terre Haute paper has a half-page article on censorship on the Internet, located in the SCHOOL section, page 2.
>
> Jean: ... I read through that section while I waited on my mother-in-law at the doctor's office. I also read an article in the Reader's Digest (Aug. 96 issue) about the young Chinese student that was literally saved by the Net. Do I have you interested? If so, let me know and I'll send you to a page on her story and progress!

The cultural diversity brought about some student interactions that might not have occurred otherwise. Asynchronous communication (listserv and email) provided the Asian students with the opportunity to think about their comments and carefully write their messages. Just as in the immediate nature of a classroom, the foreign students struggled more in communicating synchronously (chat). Fortunately, the listserv format provided the opportunity for cultural differences to emerge without the hindrance of communication difficulties. The instructor has had the opportunity to observe the Asian students in regular classroom environments and they are not regular contributors to the conversation. The listserv communication gave other students the benefit of learning from the Asian students in a way they might not have otherwise had the opportunity. The students expressed this during the debriefing session:

Jean: Some of the best discussions were generated by the foreign students - such as those about the web mall and web library.

Ken: ...I found some of the things said offensive, but I didn't say anything because I realized it was a cultural thing...such as suggestions that the government should come in and take over control of the Internet.

By the same token, the foreign students received a slightly different perspective on perceptions of US students as expressed by one Asian student in his journal:

> ... the privacy issue. I have some opinions about it. In America, the privacy issue is a very important topic in people's daily lives. People want to protect their privacy in different aspects. I think the privacy for Americans is more important than anything else. On the other hand, for Chinese, privacy is not viewed as an important issue in our daily lives. People can ask other's age, weight, and salary at any time. It is a kind of common greeting for people. It is very interesting, right?

Cultural differences weren't the only interesting student interaction to occur. As discussed earlier in the paper, Partee (1996) describes how distance environments and telecommunications can liberate some students. One student in particular exemplified Partee's description. The instructor had had no prior experience with this student. Therefore, when the student was a constant and important presence during listserv conversations (both in a supportive way and through initiation and continuation of discussions) and on the chat, it was presumed that this was the demeanor usually portrayed by the student, in any classroom environment. However, the debriefing session revealed otherwise:

Jean: He was more assertive and stood his ground better in written form [over the listserv] than in a classroom. In a [regular] class, he can say something, but then if someone else challenges it...

Dennis: I'm a wimp.

Jean: [laughter] ....not exactly, you just try to compromise. You aren't as likely to take a stand.

Ken: I noticed the same thing. I have had at least five classes with you, and I have never seen you participate this much.

Furthermore, as experienced by these students, Dennis was not as participative during the debriefing session as his participation during the on-line class might have suggested.

Many of these student interactions might have occurred during a regular classroom. What is important to note is that they could also occur in a virtual classroom. Additionally, some the student interactions (i.e., cultural difference, student demeanor) might have developed further in the virtual classroom that had few constraints than they would have in a regular classroom.

Faculty-Student Interaction

Sometimes in qualitative research, a lack of evidence can be as telling as immense piles of data. Such was the case when considering faculty-student interaction. In other words, the instructor was not omnipresent during the asynchronous class discussions, thereby allowing the student-to-student interaction and the peer support to occur. An examination of the email messages revealed that of the roughly 400 email messages that were not directly related to courses assignments, the instructor generated less than one quarter of these messages. Due to the strong student interaction and discussion, questions that were posed to the instructor over the listserv would be answered by other class members to the satisfaction of the original inquiry. An example of a question that was developed based on a previous class assignment and the corresponding answer by a student follows:

Daniel: has anyone been punished under the CDA?

Ken: My understanding from the material I read for the CDA paper is that the US Attorney General's office announced they would hold off on

pursuing prosecution until the three judge panel made their decision. However, I have read articles of prosecution taking place at local and state levels. Some of this was shared in reading material provided or referred to by Dr. Powers, one was in the T.H. Tribune article I mentioned to the class, last week.

Conversely however, the instructor remained a critical component of the chat facility. Students who tried to initiate discussion on chat before the instructor logged on were not terribly successful.

I tried to start the ball rolling before Dr. Powers arrived - no one took the bait. It seems as though everyone is dragging a little bit - or it could be me. Anyway, the chat went well after Dr. Powers arrived.

The perception may remain for students that although the chat performs as a virtual classroom, it is still perceptually a classroom where the instructor retains control. On the other end of the spectrum, the listserv is more similar to discussion that takes place outside the confines of a classroom and therefore is not limited to instructor influence and control.

Time Demands

This theme emerged largely due to comments made during the debriefing session and from the student journals. There was a great deal of evidence that students found this course demanding in terms of the amount of time required to complete assignments and for maintaining class communication.

Ken: I felt overwhelmed at first (until this week), I wasn't sure I was going to get everything done.

Dennis: Whewww. I can't believe I don't have my back against the wall in regards to project completion.

Over half of the students' time logs revealed times such as five hours or seven hours spent nightly working on the course.

At first blush, that amount of time spent daily on a graduate course might appear to be excessive. However, a closer examination of the journals and time logs also revealed that students perceived that ALL time spent on the computer was related to the class. For example, students would begin on a class assignment and go to an assigned web site to read the information. While there, they would follow some web links and begin to wander off to unassigned web sites. This action was definitely beneficial to their overall learning, but did add to the perceived time they spent on class assignments.

General Internet surfing also added to the perceived time students spent on the assignments. In the second half of the course, students were often expected to search for web sites that might be applicable to papers that were being written, or for the web site they were themselves developing. The web searches often encouraged students to do some extracurricular Internet surfing. Again, while beneficial to the overall development of their knowledge of the Internet, it was not an actual component of the course. Students generally perceived that any time spent in front of the computer was related to time they spent on this course. The journals and some listserv messages revealed that not all of the recorded and perceived time was spent on assignments:

> Dennis (journal): ...spent two hours surfing the net. Discovered that I am hooked...however I need to take my learning to the next level.
>
> Ken (journal): I spent nearly five hours reading assignments, reading email and visiting web sites....I really enjoy this though. A couple of hours go by and I hardly notice....
>
> Teresa (journal): I really like looking at other web sites... and time pasts so fast when you get into sites you like. Today I planned to work for an hour, but time is flying when I look at the clock.
>
> Ken (listserv): check out the "work in progress" animation. Its cool. I think I got there through the `Netscape information' link at the bottom of our Emerging Technologies class page. Or go to

http://home.netscape.com/comprod/products/navigator/version_2.0/java_applets/.

There is no doubt that this recreational Internet exploration had a value-added benefit. However, what is interesting is the perception that because all of the rest of the class involves on-line time, that any additional on-line time must be related to the time in the class.

## DISCUSSION

Many of the factors and themes that emerged in this research study were illustrative of what Sugar and Bonk (1995) described in their article. Cognitive dissonance did arise (based largely on the cultural differences of the students), and the challenges that arise from the community of learners and the technology itself provides avenues for new learning as demonstrated by the time spent exploring the Internet beyond class assignments and the lengthy conversations held by students. These students would not have had the same types of new experiences, challenges, and growth in a regular classroom or lab situation as they had participating in the virtual classroom.

Some parts of the community emerged, not by effort as Kerka (1996) warned, but rather out of necessity and survival on the part of the students. Students found themselves bonded by a common experience and needs and were able to take that, despite the lack of experience on the part of some, and turn it into a true classroom community that was not bound by geographic space. No effort was made on the part of the instructor to develop that community or even to foster it. Student interacted with each other and provided each other with support because it fulfilled needs and provided assistance with the course.

Not suprisingly, the asynchronous and synchronous communication were partitioned by the students into performing different functions and thereby fulfilling different needs. The domain of asynchronous communication belonged to the community of learners where everyone played an equal role, including the instructor. With few

exceptions, everyone felt an equal responsibility to respond and communicate and ultimately missed the conversation when other class assignments demanded time away from the class listserv. Conversely, the synchronous classroom remained the domain of the instructor, much as does a traditional classroom. Although some students attempted to stimulate and develop conversation and thereby a community of learners, only those who were "officially" appointed by the instructor to lead a discussion where able to successfully do so.

## Limitations

The major limitation of this study is that it covers only one course and a course that specifically dealt with information technologies. Therefore, although there were a few students who were not familiar with the electronic communication tools, they were able to learn the tools as part of completing course assignments. The ability to use the tools of the virtual classroom is what enables a community of learners to develop. A course delivered over the Internet on the topic of Western Civilization does not have the luxury of spending weeks allowing students to become acclimated with the technologies and therefore may not be able to achieve the same type of community development.

## Implications & Future Research

The results obtained from this research indicate that it is possible to develop a community of learners and that students' performance in and perceptions of a class remain positive. The instructor must allow for changes in the class interactions to occur, including a differential relationship with the class. Sugar and Bonk (1995) are correct in saying that these tools have the opportunity to enrich the dialogues and discussion that carry on in a classroom. One broad implication of this result is that perhaps some of these communication tools (such as the asynchronous ones) be used to enrich classroom discussions in classes that meet face-to-face. There is no reason why some of the student

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Figure 1: Sample Course Schedule

**Course Syllabus and Lectures**

- Tuesday, July 15 - Overview of Class
- Wednesday, July 16- What is Media Literacy?

- Thursday, July 17- Information Technologies and the Internet
- Friday, July 18- Gopher
- Monday, July 21 - Newsgroups
- Tuesday, July 22- Listservs
- Wednesday, July 23- World Wide Web

- Thursday, July 24 - Discussion on Free Speech Papers
- Friday, July 25 - Return to Media Literacy
- Monday, July 28 - Components of Good Information

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Table 1: Example of Data Organization

Student-to-student Interaction

| Student Name | Date | Data Source | Description |
|---|---|---|---|
| Ken | 8-16 | Debrief | Chat...I just couldn't get enough of the conversation. I talked to Daniel.and Dennis all the way out to the car. |
| Jean | 8-16 | Debrief | Some of the best discussions were generated by the foreign students, such as the web mall or web library. |
| Teresa | 8-12 | Journal | In our course, the part of the class I like the most is the on-line chat. I like attending class always. Actually, I like contact with people more than working by myself. |
| Daniel | 8-6 | Journal | Some classmates suggested to me that I just jump into the editing part and do it. I think it was a very good idea for me because I always tried to rea and then do it. I hope it works |
| Ken | 8-8 | Listserv response | Is there any way for anyone to k if you monitor accounts' e-mail? Is anyone responsible for checking or monitoring the sysops actions? And what is the probability of anyone knowing? |